DOCUMENT RESUME

ED 132 691 EA 008 978

AUTHOR Hanson, J. Robert
TITLE Potential Applications of Matrix Organization Theory for the New Jersey Department of Education. Position Paper.
PUB DATE Nov 76
NOTE 37p.; Best available copy

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Change Strategies; *Efficiency; Information Dissemination; Input Output Analysis; Management by Objectives; Management Information Systems; *Management Systems; Models; *Organizational Effectiveness; *Organizational Theories; Productivity; Scheduling; *State Departments of Education
IDENTIFIERS *New Jersey

ABSTRACT

Matrix organization focuses on the shift from cost center or process input planning to product output or results planning. Matrix organization puts the personnel and the resources where they are needed to get the job done. This management efficiency is brought about by dividing all organizational activities into two areas: (1) input or maintenance services are dubbed "functions," that is, research, marketing, legal services, program development, evaluation, financial, and (2) output or product results that come directly from "program management," that is, the personnel and resources on the "line" that actually do the needed job for the client--the student. Functions tend to be "staff" responsibilities; project management or matrix modes tend to be "line" or production responsibilities. Matrix organizational theory focuses management's attention on productivity rather than on institutional maintenance. This paper proposes an analysis of how existing practices judged effective in the New Jersey Department of Education can be maintained or expanded, and how those management practices judged less than effective may be changed or discontinued. (Author/MLF)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED132691

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Position Paper

Potential Applications of Matrix Organization Theory for the New Jersey Department of Education

BEST COPY AVAILABLE

J. Robert Hanson
November, 1976

EA 008 978

ABSTRACT

Matrix organization focuses on the shift from cost center or process/input planning to product, output or results planning. Matrix organization puts the personnel and the resources where they are needed to get the job done. This management efficiency is brought about by dividing all organizational activities into two areas: 1) input or maintenance services which are dubbed "functions," e.g., research, marketing, legal services, program development, evaluation, financial, and 2) output or product results which come directly from "program management," e.g., the personnel and resources on the "line" that actually do the needed job for the client - the student. Functions tend to be "staff" responsibilities; project management or matrix modes tend to be "line" or production responsibilities. Matrix organizational theory focuses management's attention on productivity rather than institutional maintenance, per se. Productivity, of course, is always in relation to something. In the case of the NJDE it is the myriad needs of T & E in quality terms. Through careful and systematic planning a series of goals and highly refined objectives are assigned to both cost centers (functional areas) and product centers (project management areas).

This assignment of needs is done within the existing Departmental organization by slowly implementing the project management concept. Project management or product center organization is determined by priority areas needing immediate implementation, but crossing several functional divisions.

Organizational symptoms within the Department suggesting the need for project or matrix management include:

1) managers and directors lacking adequate financial information and control over their own projects. Divisions heads, for example, do not know how much it costs to prepare a product or deliver a service.

2) cumbersome and inadequate communications channels between divisions and programs, especially between product development and dissemination activities.

3) the Department is insufficiently oriented to the needs of students because of the internal emphasis on functional organization.

4) lack of communication between divisions and programs creates the antitheses of team effort and wastes a precious resource-professional staff time.

5) long range planning appears to be sporadic and superficial. This leads to overstaffing, inefficiency and duplication of effort.

Project or matrix organization is a response to these difficulties.

The distinctive features of project or matrix management are:

1. Activities and functions overlapping several divisions are placed under the single direction of a project manager who controls all facets of the project's organization, including, but not restricted to:

   a. personnel
   b. costs (purchasing, monthly cash flow, balances, budgeting)
   c. product development (or services)
   d. interdivisional communications
   e. on-site development, monitoring and evaluation
   f. dissemination (marketing products or services) and public relations

2. Each project has a Board consisting of the division heads (or deputies) with staff assigned to the project. This group serves as both advisors to the project manager, and as communication links with the rest of the Department.

3. The project manager is recognized, on the organizational level, as a co-equal or peer with the division or function heads.

4. Project management provides for lateral product (or service) development and maximum communication flow within the constraints of effectiveness and efficiency. When the project's objectives have been completed the project is dissolved, and staff are reassigned to their division or to a new project.

5. Professional project personnel report to two bosses, but receive their work plans from the project manager. The two bosses are 1) the project manager, and 2) their functional division head.

6. Matrix management rests on two interrelated and interdependent information and decision-making systems: a) management by objectives, and b) formal and informal management information systems.

7. Matrix management modes are planned, funded, and evaluated on the basis of prepared objectives with performance standards and delivery dates.

8. Matrix management theory requires that productive and efficient personnel be recognized and rewarded for their achievements against their predetermined objectives.

I Introduction

Currently the NJDE is utilizing, in various degrees, many of the organizational modes described in this paper. Thus, what is proposed is an analysis of how existing practices judged effective can be maintained or expanded, and how those management practices judged less than effective may be planned for needed change or discontinued. The change model is incremental and should be planned over a three to five year cycle. Developmental functions pertinent to T & E should be processed first. Maintenance or operational functions can follow in later years.

The concept of matrix organization is not new. The businesses closely related to the defense establishment have been evolving refinements of matrix organization for the last 20 years. In more recent years large numbers of companies in the private sector have adopted variations of the matrix model. This matrix model adoption activities is closely related to the development of the sister technologies of scientific scheduling (PERT, TSG's, flow charting, CPM, etc.) and MBO. In fact, both technologies are essential to the repertoire of those organizations contemplating organizational changes involving matrix modes of operation.

The benefits of matrix organization responses for certain activities become apparent when the existing organization cannot deal with increased diversity of output, high levels of task uncertainty, and increasing interdependencies between existing functional areas. The underlying management concept which ties these three areas of difficulty together is the concept of scheduling, or scheduling "slack." Inherent, also, in all three difficulties is the problem of sharing crucial information with the poeple who need it, at the time that they need it.

Scheduling, as a concept, is the concern in the private sector for the maximum utilization of all resources, e.g., equipment, facilities, and personnel. When equipment is idle unit production costs rise. Idle equipment also means dollar loss through the time loss of non-productive personnel. Time loss, or slack, is the reason behind the technological development of systems like PERT and MBO. Slack is addressed in these management systems by scheduling wherein non-productive time is reduced to a minimum by measurably stating the objectives for each project unit, commiting those objectives to allowable costs, and assigning each objective to a series of due dates. Without such control, slack becomes the norm. The non-completion of tasks becomes commonplace. Under stress or crisis situations, slack leads to increased bureaucratization through the addition of new personnel. These additional personnel, in turn, aggravate the scheduling problem and contribute to greater slack. As a result of not meeting deadlines, or meeting them with less than satisfactory products, the tasks are reconceived, the timelines extended and new personnel are added. Parkinkson said it, "Today's slack is tomorrow's law."

This recurrent slack phenomenon in the private sector was cause for alarm since contractual work in defense-related industries was awarded on the basis of performance specifications and default carried with it heavy penalties, either for tardiness in product delivery and/or for under or non-performance on the contracted items.

In short, most organizational reform is directed to decreasing slack, and to increasing the management of information flow. The two go hand-in-hand. High slack is due to poor information flow. Obversely, high and pertinent information flow contribute to the reduction of slack.

Similar difficulties now face most agencies and institutions in the public sector. The NJDE is no exception. With 1600 employees spread throughout the State, a 16 million dollar (+) budget, and a traditional or functional organizational structure the Department faces the same demands for change as does the private sector. The demands of the Legislature and the public to increase productivity (the "thorough and efficient" legislation) and to reduce costs necessitates a hard look at the Department's management operations. Additionally, most of the management changes that need to be made must be accomplished without additional funds or personnel because of budget restrictions. In short, slack situations must be identified; communications barriers must be recognized and removed; functional and product centers must be identified, and overlapping task areas must be reduced. Matrix or project management organization is one response to this series of pressures.

The author of this paper is aware of the many changes that will need to be systematically implemented for matrix organization to occur. The results will, however, be well worth the effort in increased productivity, lower costs, and improved morale for those wishing to better serve the children of our state.

Certain disclaimers are necessary before detailing the advantages and disadvantages of matrix modes of organization. To paraphrase Jay Galbraith there are two basic premises behind all planning:

1) there is no one best way;

2) choice <u>makes</u> a difference.

Success is not random selection. Some structures will <u>not</u> work. Choices must be contingent on achievable ends. In short, the criteria for the goodness of an organizational mode is that of "fit", or how well it does the job.

The concluding sections of the paper deal with:

I Types of Organizational Models
II Organizational Needs and Matrix Planning
III A Proposal for Implementing Matrix Organization in the NJDE
IV Appendices

I Types of Organizational Models

In order to more specifically identify the matrix or project management model it may be useful to briefly define major characteristics, and then to compare the relative advantages of each.

1. The functional or staff organization. In this mode, the project manager works within a single functional area or division with personnel in that division. It is a service or regulatory function within the department. As a cost center it has limited jurisdiction for management outside of its own jurisdiction. It must rely on other functional units for finance, legal assistance, public relations, product development, evaluation, dissemination, etc.

2. The matrix, project management or product center. This organizational mode requires the approval of top management to establish a project organization overlapping several existing functional units in order to accomplish urgent and time constrained products or services overlapping several divisions, programs or functions. The T & E efforts under Dr. Gappert's supervision is a modified example of matrix organization -- with the exception of total cost controls. Matrix organization is focused on short range needs.

3. The integrated project organization differs from the matrix concept only in that the project's management has been made a permanent part of the agency's operation, but remains cross functional. Integrated organization is focused on longer range or recurring needs.

Figure #1

Advantages Of These Three Organizational Modes

Functional

1. Minimizes organizational disruption
2. Few new roles
3. Maximum use of hierarchy
4. Business as usual
5. Consistency of standards, policies and procedures
6. Avoids project organization problems, e.g., multiple bosses, complex communications, and formalized lateral relationships

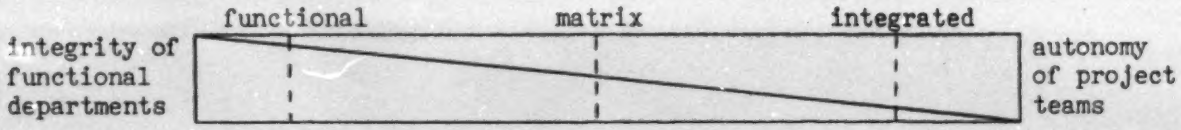
Matrix

1. Complete project control
2. Checks and balances between project manager and project Board
3. Shorter development time
4. Precise allocations of time and personnel
5. Fewer people
6. Lower overhead and administrative costs
7. High specialization where functional support requires
8. More quickly staffed, and more easily dissolved
9. More effective feedback of experience into the development process
10. Stretches manpower by permitting more projects to be managed within the Department's organizational structure
11. Useful for smaller, less urgent projects
12. Easier to measure performance
13. Lowers communications problems

Integrated

1. Complete project control
2. Shorter development time
3. Vastly improved client relationships
4. Provides maximum control over staff and resources
5. Provides for improved communication between staff and Department
6. Avoids the multiple boss system
7. Most useful for projects having a high degree of urgency, technical span, and of a uniquely large size
8. Easy to measure performance

In short, in terms of the poles of functional integrity and project automony the relationships are as follows:



A function, or a functional unit (the terms are used interchangeably) is a cost center with statutory or traditional responsibilities for repetitive tasks, generally of a maintenance character, for the total organization. For example, Administration and Finance, Controversies and Disputes, Field Services, etc. Functions are more difficult to identify in the public sector because of the more complex nature of the subentities in an organization having no clearly specified goals, objectives, or evaluation designs. Many of the divisions in the NJDE are a carbon copy of the total organization on a miniature scale with the notable exceptions of financial control or the interpretive functions of Controversies and Disputes.

Functional activities addressed by the divisions include cost controls, legal services, public relations, research, budgeting, dissemination, evaluation, planning, and training, etc.

In the matrix mode we are describing the educational management counterpart to the profit center. If a functional area is a cost center, then a project organization or matrix mode is a product center. In short, the project or matrix organization is the production activity of the business or agency. Productivity centers have their own costs, of course, but they are production and not maintenance costs. In short, the matrix organization justifies its operational costs, i.e., the quality production of predetermined and measurably stated outcomes, against critical delivery dates. For cost control purposes, the functional

or cost center units are generally charged to indirect costs, whereas the production functions or project management costs are charged to direct costs. Both functional and matrix units have overhead costs.

A synoptic view of parallel functions between business headings and the NJDE's divisions may be helpful to the reader. Please see Figure #2.

Figure #2
Parallel Terminology

Private Sector		NJDE	
Cost Center (Functions)	Product Center (Products/Services)	Cost Center (Functions)	Product Center Products/Services
1. Research		1. RP&E	
2. Legal Services		2. Controversies & Disputes	
3. Marketing		3. RP&E dissemination	
4. Product Development		4. School Programs; Voc. Ed.	
5. Evaluation		5. RP&E	
6. Policy Planning		6. Senior Staff	
7. Public Relations		7. Commissioner's Office	
8. Training	1. Manufacturing (products)	8. No organized counterpart Dept.-wide	1. RP&E (R & D) "Programs That Work"
9. Quality Control	2. Services	9. No organized counterpart	2. Special training programs across several divisions for SEA/LEA staff

More specifically, the matrix model is so named because personnel are assigned to the project from those functional areas pertinent to the project's success. The diagram which follows shows the functional roles necessary to a particular project. The term, "matrix", references the lateral makeup of project staff.

The dot-pointed functions in the diagram identify the need for different types of personnel from within the functional areas.

Figure No. 3

DESIGN ALTERNATIVE "A"
MATRIX ORGANIZATION

	STATE BOARD OF EDUCATION									
	COMMISSIONER									
PRODUCTIVITY CENTERS	DIVISION HEADS (COST CENTER MANAGERS)									PROJECT BOARDS
	FUNCTIONS (REPRESENTED BY DIVISIONS)									
PROJECTS	ADM. & FIN.	R.P.&E.	SCH'L PROG'S	FIELD SERVICES	CON. & DIS.	VOC. ED.	DEP. COM'M.	LIBRARY	MUSEUM	
1. T & E	· costing · personnel · purchases	· development · evaluation · research	· development · training	· regulations interp.	· legal interp.	· development	· monitoring	· research	· dissemination	Representatives from all cost centers
2. BASIC SKILLS	· costing · personnel · purchases	· development · evaluation	· training		· legal interp's	· development	· monitoring	· research		Selected cost center reps.
3. URBAN ED'N	· costing · personnel · purchases	· evaluation	· development							Selected cost center reps.
4. GIFTED AND TALENTED	· costing · personnel · purchases	· evaluation · research	· development · training							Selected cost center reps.
etc.										
FUNCTIONAL/ PROFESSIONAL ASSOCIATIONS WITHIN THE DEPARTMENT	finance	research/ evaluation	curr. dev. training	regulations	legal assistance	curr. dev.	planning/ organization	research	exhibits	

In a nutshell, matrix organization is a way of commiting a priority issue for development to a self-contained project organization rather than dispersing aspects of the overall tasks across sections of several divisions. A project manager is selected by divisional or NJDE Senior Staff and is given control over all functional activities within that project. Functional activities are carried out by personnel from the pertinent divisions assigned to the particular project. For the duration of the project, or for their involvement in the project, they are responsible primarily to the project manager. The assumption is, of course, that personnel assigned have a detailed knowledge of the skills necessary for that particular function, e.g., processing purchase orders, keeping the books, interpreting the Administrative Code, conducting research and evaluation, etc.

Generally, the matrix project management model can be effectively applied to one-time undertakings that are a) clearly definable in terms of specific goals and objectives; b) are infrequent, unique or unfamiliar to the present organization; c) are complex with respect to the interdependence of detailed task accomplishment, and d) are critical to the Department's leadership and/or pose the threats of dollar loss or serious personnel penalties.

A comparison of functional and matrix forms may be helpful.

Figure #4
Synoptic Analysis

Functional Form	*Matrix Form*
1. assumes a continuous flow of products or services	1. assumes product or service is unique, developmental, non-repetitive
2. assumes substantial similarity in tasks performed	2. assumes uniqueness of task
3. not responsible for costs or output	3. total control over costs, quality and quantity of output
4. no single person responsible	4. project manager responsible for all phases of project operation
5. inclination to isolation, fiefdoms, promote and preserve special activities, technologies	5. works for a unified inclusive end product; shares information across all cost centers and with staff
6. narrowly focused range of concern	6. concerned for overall success of project covering all pertinent functional areas
7. restricted information flow and decision-making	7. high information flow; encourage input and discussion of alternatives; invites conflicting opinions
8. slow decision-making process requiring several levels of management for solution	8. decisioning is with project manager and project Board on an as-needed basis; open communication model
9. not characteristically flexible	9. highly flexible

Matrix project organization provides for the control necessary to see the project through to successful completion within time and cost constraints. Matrix organization requires total control over:

1. scheduling
2. costs
3. design, modify and purchase decisions
4. monitoring and evaluation (against objectives)
5. information flow and reporting
6. identification and solution of problems
7. supervision (and control over) all project personnel, and
8. control over all subcontracting

Each of the three models also has disadvantages. Obviously these must also be considered in getting an organizational mix that will be efficient over all. The assumption is that there will be problems associated with the transition to a "matrix" or "integrated" organization, but that on balance they are problems of lesser magnitude than presently confronted in the functional organization. The trade-off says something to the effect that the resolution of the transitional problems are worth the cost in terms of increased productivity. The initial problems or disadvantages of matrix organization are:

1. dual authority structures, i.e., project personnel report to two bosses
2. requires provision for reward or recognition for personnel completing their objectives on time and within cost constraints
3. requires on-the-job training opportunities
4. requires adjustment time re: new procedures within the Department, e.g., centralizing authority by project. The co-equality of project managers and division heads, the elimination of the existing program level structure, etc.

5. requires a highly developed MBO system for management projects
6. requires commitment of Commissioner, Deputy Commissioner and Senior Staff to project management concept.
7. requires on-going management training opportunities
8. requires high speed information exchange systems

II Organizational Needs of the NJDE and Matrix Planning

The NJDE presently consists of 11 divisions, 67 programs, and within those programs some 230 (+) separate projects. This division of activities has traditionally been functional in nature. In addition to the large (and often overlapping) number of projects there are some 1000 professional personnel distributed over some 30 different physical locations. For the sake of simple averaging this means that the ten heads of operational divisions (excluding the Commissioner's division) are responsible for managing approximately 23 project cost centers each! In actuality the figures for nine of these division heads (excluding Controversies and Disputes) are much higher with some heads having as many as 50 separate projects, e.g., Vocational Education. This situation is further complicated by the addition of a program level structure, i.e., the division head must also be aware of approximately seven program areas within which his 25 project activities fall. It is easy to understand why there is extensive overlapping of functional and program activities. These 67 (+-) program level managers have immediate responsibility for the projects within their program clusters. This number varies from one project (where the program and project are one and the same), to 20 projects.[1] This data is mentioned only to reference the highly complex nature of sharing information within the Department, and, more critically, across cost centers with overlapping functions.

It is important to note that the existing NJDE organizational structure (i.e., the 11 divisions and 230 projects) is primarily the result of a functional evolution of activities taking place very largely in isolation from one another. This isolation exists not only between divisions, but also within divisions. This isolation of personnel and tasks is due both to the mandated

nature of many of the tasks, but, perhaps, even more so, to the lack of a highly focused management plan, and an integrated information-sharing system.

A preliminary analysis of the functions submitted by divisions in their Operational Plans for 76-77 shows a chaotic mixture of policy, management and operational activities. Additionally, the specific functions cover activities of different magnitudes; often are non quantifiable; reference (by and large) no project or Department priorities; and are cross-functional in nature, i.e., in the aggregate the divisional functions resemble the whole Dpeartment in microcosm. This cross functional character or disparity is illustrated in the diagram below (Fig. #6). Nonetheless, some management insights can be gained from looking at the nature and numerical distribution of functions. This author believes that there is a relationship between the number and category (i.e., operational or developmental) of functions and the efficiency with which the particular division is run! For example, the four divisions first to submit their Operational Plans for 76-77 submitted significantly higher numbers of clearly specified functions than did the others. The promptness of this response suggests higher levels of internal management coherence than for the others. One postulate might be that divisions with fewer articulated functions are not as well organized, and perhaps are not as efficient, as those with many functions. This postulate rests on the contention that the specification of highly detailed functions represents a more careful analysis of the activities required to complete objectives. The data is as follows:

Figure #5

Division	N Functions	Mean
Commissioner's Office	19	9.5*
Field Services	42	6.0
Administration & Finance	25	5.0
Controversies	16	4.0
School Programs	44	8.8**
Research, Planning & Evaluation	48	6.9
Vocational Education	67	8.4**
Library	66	9.4**
Museum	140	20.0**
Katzenbach	28	7
Deputy Commissioner	No data	-

**Divisions indicated by an asterisk were the first to submit their Operational Plan.

* The Operational Plan for the Commissioner's Office, in terms of functions, does not apply since those plans were prepared by this author, and then submitted for approval.

Figure #6
Cross Functional Character of Divisions*

Policy Planning	Functions		Projects	
"Corporate Staff"	SEA	LEA	SEA	LEA
Commissioner's Office	Commissioner			
Deputy Commissioner's Office	Deputy Commissioner		Deputy Commissioner	
Senior Staff				
Policy Research	Policy Research Library A & F C & D R P & E Field Services	A & F R P & E Field Services	Policy Research A & F R P & E Field Services Museum Voc. Ed.	A & F R P & E Voc. Ed. Katzenbach
	School Progs.	School Progs.	School Progs.	School Progs.

(*In the "Index to the Operational Plan" prepared by this author the operations of the Department fall somewhat naturally into four categories, i.e., 1) services within the Department, per se; 2) services to local schools; 3) services to the public at large, and 4) services to the deaf. Please see Appendix A.)

Jay Galbraith suggests three headings or strategic areas against which organizational needs can be identified, and matrix responses suggested, i.e., 1) diversity of output, 2) high levels of task uncertainty, and 3) need for divisional interdependence. This author suggests that the following are needs of the Department and that these needs lend themselves to matrix solutions:

1) Diversity of output

- too many overlapping and yet unrelated project activities
- too few effective ways of evaluating utility of output
- inadequate methodologies for relating output to priorities, e.g., is what is being done needed? is it being done in several places? if it were discontinued would it be missed?

2) High levels of task uncertainty

- is the task clearly related to a priority?
- inadequate methods for managing priority-related tasks overlapping several divisions
- inadequate methods for relating critical information quickly across policy, management and operational levels
- need for improved control mechanisms for personnel, tasks and costs
- need for improved methods of identifying personnel for management roles
- need for improved methods of assigning and training management personnel

3) High levels of divisional interdependence

- need for improved procedures for integrating functions across divisions
- need to reduce excessive costs for task replications, i.e., redundant activities across divisions

- need to improve mechanisms for sharing critical information
- need for improved mechanisms for updating the Department's MBO/Operational Plan
- need to improve mechanisms for monitoring and evaluating the Operational Plan within functional and management projects

These needs have been educed from an analysis of the Department's Operational Plan for 76-77. Much of the data is already out-of-date. Additionally, this author is not privy to the actions of Senior Staff and many of these needs may already have been addressed. Nonetheless it is probably still reasonably safe to suggest that many of these organizational needs have been caused by the lack of management procedures for separating functional from product activities. Currently, to this author's knowledge, it is still virtually impossible to transfer project funds should a needs assessment indicate the need to do so. It is not presently possible to cost out objectives. It is nearly impossible to secure monthly data on project cash flow. It often costs more in time to process a purchase order than the value of the item purchased. Delivery time on purchased items often can take months. There are no vehicles for uniform project, program or divisional evaluation. There are no programs for management training, etc. These and related organizational needs suggest the immediacy of searching for alternative organizational strategies.

III Implementing Matrix Organization Planning in the NJDE: A Proposal

In order to reduce excessive slack in Departmental operations, and to increase productivity the following objectives are proposed for Senior Staff action in 1976-77:

1. Complete a Departmental management study identifying needed functional and product management headings for organizational change.

2. Propose and submit such legislation as may be needed to implement priority recommendations of the management study.

3. Plan and implement at least two (2) project management centers by June, 1977.

4. Complete a study identifying critical management competencies by June, 1977.

5. Select and train 50 professional staff in those management competencies by January, 1978.

6. Adopt a recognition and reward system for productive managers for implementation by February, 1978.

7. Reduce the total number of program cost centers in the Department by 10% by January, 1977.

8. Reduce the total number of project cost centers by 30% by June, 1977.

9. Implement a Department-wide organizational analysis and evaluation system by June, 1977.

10. Implement an internal management information flow plan by January, 1977.

11. Adopt new functional headings and objectives for the proposed reorganization of divisions by June, 1977.

These objectives are not so difficult to implement as they may appear on initial reading. Much progress has been made internally in bringing about needed management changes in the last 24 months. Many of these changes directly contribute to, or have already made possible, the objectives proposed. These changes include:

1. the implementation of the MBO/Operational Plan
2. the transition to cost center accounting
3. the establishment of the unit on Organizational Analysis and Evaluation
4. the modified matrix management of T & E activities
5. the establishment of an external MIS
6. the identification of Departmental priority areas, e.g., "Eight Steps"
7. the identification of new leaderships for the divisions
8. the adoption of the cost center concept
9. the personnel appraisal system, and
10. the 505 efforts at developing staff competencies

Much remains to be done. Ironically, for all the focus of management science on productivity there is no research that identifies which (or what) organizational system has the highest payoff. Utilizing the motivational force of T & E the time is ripe to conduct and implement our own planning and evaluation measures for internal thoroughness and efficiency.

The following titles are proposed for the new divisional structure of the Department such that there are clear cut functional support systems for the introduction of matrix or project management.

Code #	Proposed Title	Old Code #	Old Title
01	Policy & Administration	01	Commissioner's Office
02	Department Management	12	Deputy Commissioner
03	Business, Finance & Personnel	03	Administration & Finance
04	Legal Services	04	Controversies & Disputes
05	School Programs & Services	05	Curriculum & Instruction
06	Research & Development	06	Research, Planning & Evaluation
07	Evaluation	-	-
08	Vocational Education	07	Vocational Education
09	Dissemination & Marketing	-	-
10	Organizational Analysis & Development	-	-
11	Museum	10	Museum
12	Library	09	Library

The Katzenbach School for the Deaf would become a cost center in School Programs and Services.

Proposed Department Decision Structure

The matrix or integrated decision structure operates on five levels, i.e.,

1. State Board and Commissioner

   Adopting broad policy and conducting long range planning

2. Commissioner and Senior Staff

   Implementing long range policy, and formulating policy for internal management and operations in the short range

3. Division Heads and Program Directors

   Managing functional operations

4. Project Managers and Staff

   Conducting product operations, and

5. Project Boards (consisting of functional heads)

   Advising project managers on project operations

This decisional structure and its internal information flow requirements reflect Anthony's research into those recurring elements of most planning and control systems, i.e., 1) strategic planning, 2) management, and 3) operations.[2]

This trilogy of interrelated management functions is applied to Departmental operations in a monograph by this author.[3] These interrelated levels of decisioning require open and rapid information flow and place heavy dependencies on the data collection activities of the functional divisions responsible for 1) evaluation, 2) organizational analysis and development (training) and from the product centers, per se. A communications matrix must be prepared indicating what information is to be prepared, how it is to be shared, who gets it, and what the receivers are to do with it. Essentially, there are four categories of data to be shared: data on 1) policy, 2) input, 3) output and 4) feedback.

These four data types must circulate through all communication media to personnel. Clearly, management style is critical to the open flow of information. Pettigrew reminds us that the possession of essential information is the possession of power, and that there are a variety of ways to subvert the organization by the dispersing or withholding of information.[4] Finally, when we talk about information flow we are not talking about MIS. Rather, we are

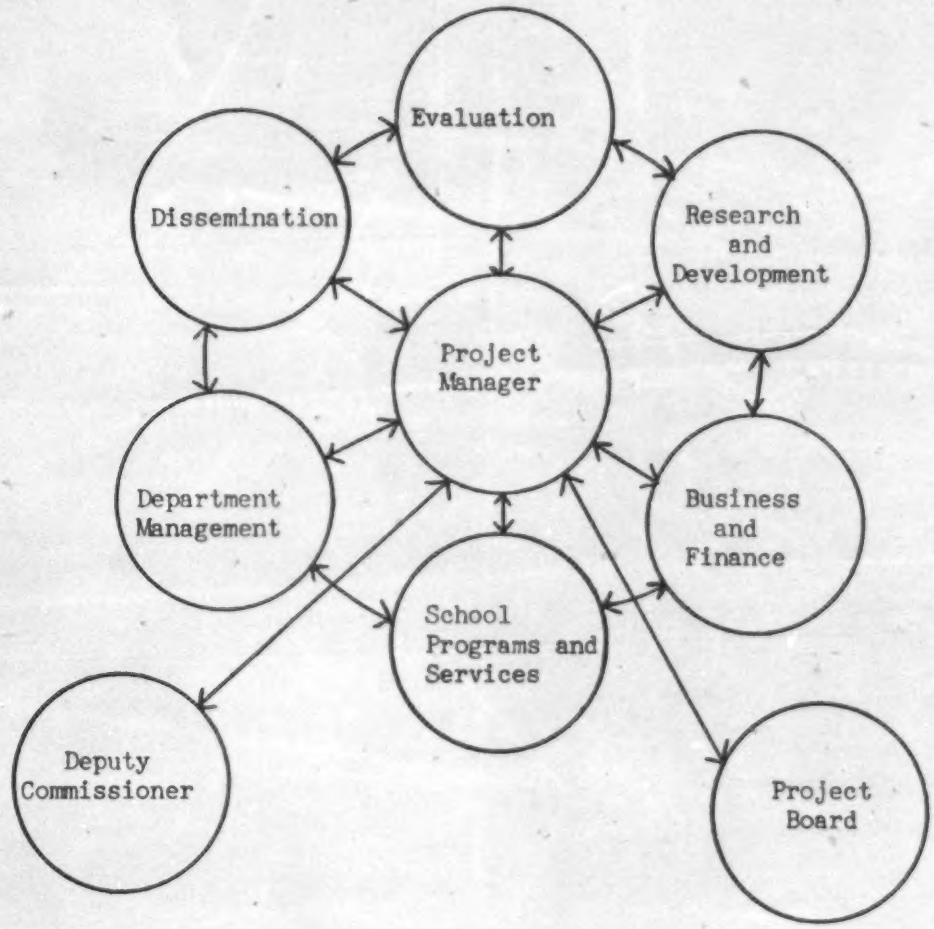
addressing an informal, primarily verbal, exchange of information. Management studies indicate that formalized information systems are not the means by which decision-makers get the data they want. Rather, as Mintzberg's[5] research shows managers strongly prefer verbal media secured in meetings and by telephone. Most effective managers do not spend time culling data from formalized information systems.

The critical decision structure for day to day matrixed operations is, of course, on the project management level. This author is not overlooking the management problems division heads have over their own functional activities. Rather, we are concentrating on the needs of project managers in the implementation of matrix management. Essentially, the project manager must be responsible for getting productivity while simultaneously securing the cooperation and goodwill from professional personnel assigned to his project from the functional divisions. The so called "two bosses" system of matrix management requires that functional personnel report both to the project manager and to their own divison head. Where difficulties arise in this dual reporting relationship the project manager and the division head work out a solution. First and foremost the matrix organization requires that the project manager be a leader. Cross functional communication is critical to the success of project management. Both the project manager (on a monthly basis) and the division head (on a semi-annual basis) complete performance appraisals on all professional personnel.

Finally, the Project Board, of which the project manager is the only full time member, serves as a vehicle for providing support services, giving advice, and resolving problems. The project manager must be a leader in this situation as well in order to secure the support and cooperation he needs to deliver his products and/or services on schedule and within costs. Project managers report to the Deputy Commissioner.

The following diagram illustrates both the composition of a project board and the information flow.

Figure #7
Proposed T & E Project Board



Project Management Costing Procedures

Project management requires that the existing cost center accounting system be carried down one additional step to the project level. All expenses of the functional cost centers, including overhead, are then charged back to the project management. This arrangement provides the project manager with

the right, in effect, to "buy" services. As such he can demand better services from the functional areas. All functional overhead costs are assigned back to the project manager on an allocation formula. This arrangement encourages the project manager to secure maximum utilization of any functional personnel he needs.

Project cost accounting provides the manager with a monthly breakdown of costs and balances.

It is important to note that matrix organization succeeds or fails on the basis of information flow. A major advantage of project organization is in having division heads serving on several project boards. This also raises the question of time in meetings. It is our contention, backed by the experience of big business, that the more productive time senior staff spend in meetings ~~and~~ with behaviorally specified agenda, the more productive are the project management (and cost center) groupings. The objective is, of course, to reduce the time necessary to complete the project by providing, in advance, the detailed information necessary for getting the job done. In short, the more constructive time is spend in project board (or Senior Staff) meetings, the lower the slack on the job. Efficient trade-offs between time spent in meetings and productivity will emerge as a matter of experience. In the interim, all project managers and all division heads must learn when to call meetings, and how to conduct them. Anthony Jay's article is of enormous help in this area.[6]

This paper has not addressed itself to implementation, training or evaluation efforts. Much remains to be done. With the best of planning, our efforts still lack the coherence and comprehensiveness we desire. Perhaps as

Charles Lindblom says in "The Science of Muddling Through" our salvation lies in not having the power to plan comprehensively. Indeed, our uncoordinated and adversarial relationships may well be a source of organizational health -- or, at least, survival.

FOOTNOTES

1. Data as submitted in the Operational Plan for 1976-77

2. Anthony, Robert N., "Planning and Control Systems: A Framework for Analysis" Studies in Management Control, Division of Research, Graduate School of Business Administration, Harvard University, Cambridge, Mass., 1965

3. Hanson, J. Robert, "Operational Plan: Rational and Procedures", an unpublished monograph, 1976. See Appendix C

4. Pettigrew's subversion categories are: 1) withholding information;2) challenging the newcomer's competence; 3) to not share the myths of the organization with newcomers, and 4) to isolate the innovation as a show piece, and then cut if off from the larger organization's daily operation.

5. Mintzberg, Henry, "The Manager's Job: Folklore and Fact", Harvard Business Review, July-August, 1975

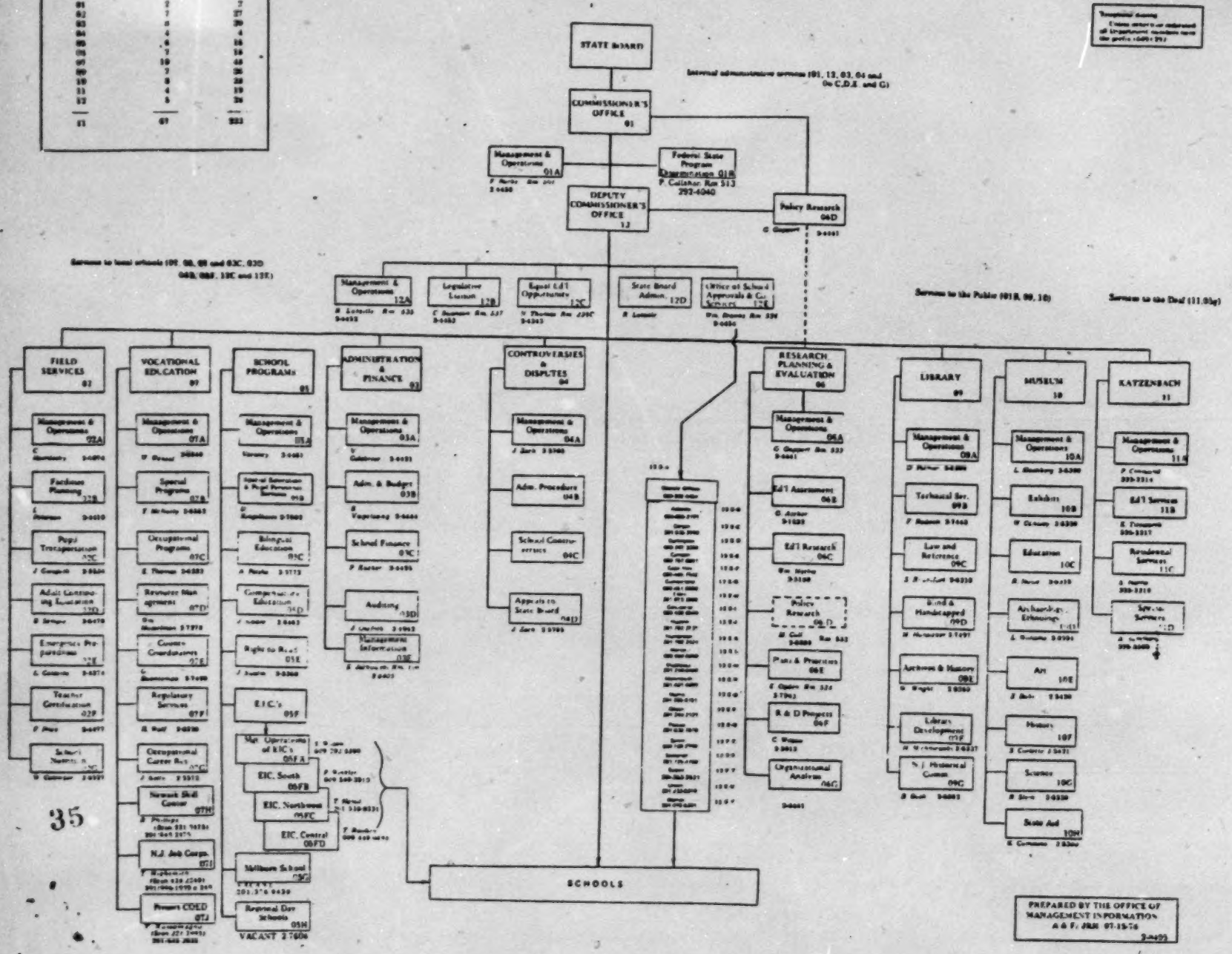
6. Jay, Anthony, "How To Run A Meeting", Harvard Business Review, March-April, 1976

APPENDICES

		Page
A	Index To The Operational Plan	29
B	Bibliography	30

INDEX TO THE OPERATIONAL PLAN
CENTRAL OFFICE
225 West State Street, Trenton, N. J. 08625
July, 1976

Division	Programs	Projects
01	2	2
02	7	37
03	6	30
04	4	4
05	6	16
06	7	16
07	10	48
08	7	26
09	8	28
10	4	19
11	5	26
11	67	322



Internal administrative services (01, 12, 03, 04 and 06 C,D,E and G)

Services to local schools (09, 08, 09 and 03C, 03D 04B, 06F, 10C and 11E)

Services to the Public (01B, 09, 10)

Services to the Deaf (11.03g)

PREPARED BY THE OFFICE OF MANAGEMENT INFORMATION
A & F, JRH 07-15-76

SELECTED BIBLIOGRAPHY

ON

PROJECT MANAGEMENT
DESIGNING THE MATRIX ORGANIZATION

ARTICLES:

Allen, Thomas J. and Cohen, Stephen. "Information Flow in Research and Development Laboratories," Administrative Science Quarterly, March 1969, pp. 12-20.

Avots, Ivars. "Why Does Project Management Fail?" California Management Review, XII, No.1, Fall, 1969, pp. 77-82.

Banker, Fisher and French. "Project Organization: Factors Affecting the Decision Environment." Organization Improvement and Development, pp. 304-309.

Bennigson, Lawrence. "The Strategy of Running Temporary Projects." Innovation, No. 24, 1971, pp. 32-41.

Galbraith, Jay R. "Matrix Organization Designs How to Combine Functional and Project Forms." Business Horizons, February 1971, pp. 29-40.

Goggin, William C. "How the Multidimensional Structure Works at Dow Corning." Harvard Business Review, Vol. 52, No. 1, Jan.-Feb., 1974, pp. 54-65.

Lawrence, Paul R. and Lorsch, Jay W. "New Management Job: the Integrator." Harvard Business Review, November - December, 1967, pp. 142-151.

Marquis, D. G. "A Project Team and PERT - Success. Or Does It?" Innovation, No. 5, 1969, pp. 26-33.

Mee, J. F. "Matrix Organizations" Business Horizons, Summer, 1964, p.70.

Middleton C.J. "How to Set up a Project Organization." Harvard Business Review, March-April, 1967, pp. 73-82.

Powers, Richard F. and Dickson, Gary W. "Misproject Management: Myths Opinions, and Reality." California Management Review, XV, No. 3, Spring, 1973, pp. 147-156.

Ziller, R.C., Stark, B.J. and Pruden, H.O. "Marginality and Integrative Management Positions," Academy of Management Journal, December 1969, pp. 487-495.